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Few Hunters Are Aware of the Many Internal Organisms Living in Our Most Important Game Species, the White-Tailed Deer. Here Is Useful Data on . . .

Parasites of Pennsylvania Deer

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MOST DEER become infected at one time or another with one or several successful parasites. Many of these organisms are small, occurring in inconspicuous places and usually in small numbers.

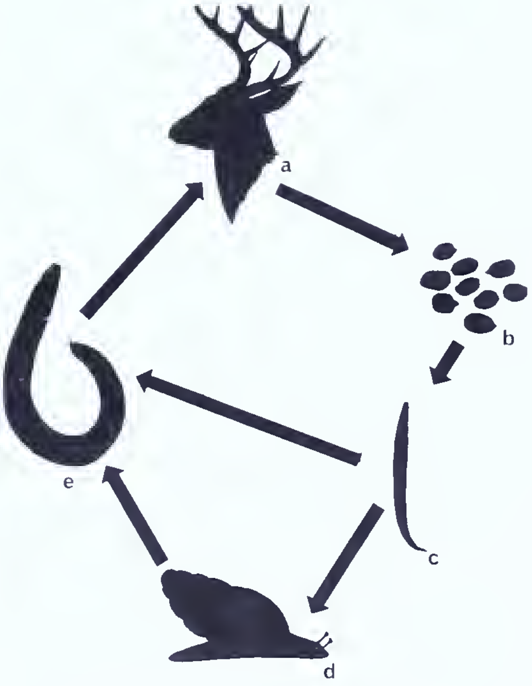
Nematodes (roundworms) are the internal parasites most commonly found. Many have direct life cycles. That is, the parasites are transmitted from one deer to another as shown in Diagram A: Adult worms in deer (a) lay eggs which exit with the feces (b). On the ground these eggs hatch and develop into larvae (c). The larvae migrate from the feces into the surrounding vegetation, where they develop to the infective stage (e) and are swallowed by deer while feeding (a). The cycle is then repeated.

Some nematodes require an intermediate host such as a snail (d) or dung beetle for development of larvae to the infective stage (e). Here larvae penetrate into the snail or beetle and therein develop to the infective forms. The intermediate hosts (d) are ingested by deer while feeding on vegetation. Life cycles of this nature are termed indirect.

Most parasites are rather specific about where in the host they will take up residence, and those found in deer are no exception. For example, the meningeal worm resides in close association with the membranes that envelop the brain — the meninges. Many deer in Pennsylvania are infected, but apparently suffer little harm from this parasite. The meningeal worm is probably responsible for a neurologic disease of moose in Minnesota and eastern Canada. Of greatest concern are the geographic areas where whitetails and moose overlap in range. White-tailed deer are probably the normal host, with little or no damage resulting from infection, but moose are a poorly adapted and hence susceptible host for the meningeal worm. Other areas reporting this worm from deer are Michigan, Minnesota, New York, Virginia, Wisconsin, most of the southeastern states and many of the eastern Canadian provinces.

The esophageal lining yields the gullet worm, a large round worm which uses dung beetles and roaches as intermediate hosts. Worms are

Diagram A



found from the stomach entrance to the tongue. Although it is a relatively unstudied organism in deer, the detrimental effects of similar worms in domestic animals have been described as being minimal. No gross damage is noted in deer.

Stomach worms are prevalent, as 81% of deer examined harbored one or both small nematode species mentioned. The direct life cycle worms are probably widespread, as present work indicates them to be common in deer from areas as far apart as southern Texas and Wisconsin. Although they usually occur in small numbers, it is not rare to find over 1000 in the true stomach of one animal. Being extremely small they are easily overlooked in the lining of the stomach.

Legworm

Another interesting parasite is the legworm, which is found under the skin of the hock, foreleg, brisket and shoulder. These long (5″-plus), slender round worms are most difficult to observe even during the skinning process. This is probably because the lower leg is the preferred location, and hunters usually do not skin out this part. Although knowledge of the life cycle of this organism is incomplete, it is felt that a blood-sucking fly is the intermediate host.

Other parasites—infrequent in occurrence—are seven species of nematodes from the gastrointestinal tract, abdominal cavity and lungs; two species of tapeworms, one adult and one immature form, found in the intestine and abdominal cavity; the larval stages of the deer bot fly found in the nasal passages; and a coccidium from the intestinal tract.

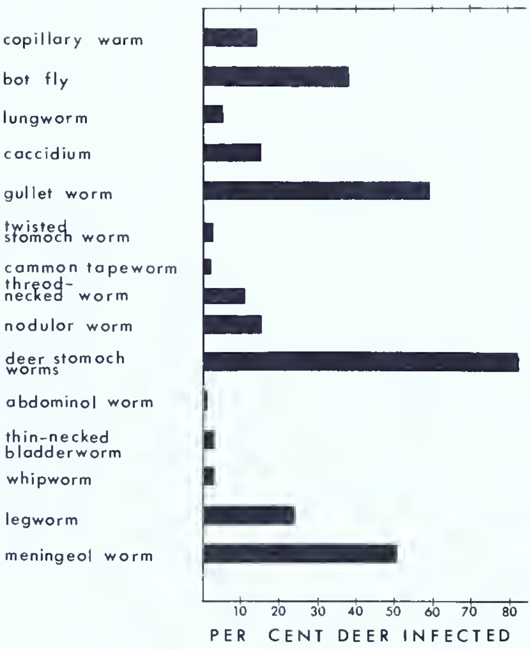
Of special note is the deer bot fly which during the fall months flies near the head of a deer and drops her larvae in a droplet of fluid on the nose. The larvae migrate to the pharyngeal pouches of the posterior nasal passage near the windpipe and develop into larvae (1″ to 2″ long). In late spring these "maggots" crawl to the tip of the nose, drop off and develop into adults during the summer. Some biologists feel that deer are killed when invaded by large numbers (40-plus) of larvae. We do not completely agree with this, since several apparently normal deer were found to be infected with large numbers of the larval stages.

The variety of parasites encountered is impressive, but cannot be considered unique to deer from Penn-

Table 1

Parasite Species Recovered, Showing Their Location in the Host

Common name	**Scientific name**	**Location of adult worm in host (deer)**
Capillary worm	*Capillaria sp.*	Small intestine
Bot fly	*Cephenemyia sp.*	Nasal passages
Lungworm	*Dictyocaulus viviparus*	Bronchioles
Coccidium	*Eimeria sp.*	Intestine
Gullet worm	*Gongylonema pulchrum*	Esophagus lining
Twisted stomach worm	*Haemonchus contortus*	True stomach (abomasum)
Common tapeworm	*Moniezia expansa*	Small intestine
Threadnecked worm	*Nematodirus filicollis*	Small intestine
Nodular worm	*Oesophagostomum venulosum*	Large intestine
Deer stomach worms	*Ostertagia odocoilei* and *Ostertagia mossi*	True stomach (abomasum)
Abdominal worm	*Setaria sp.*	Abdominal cavity
Thin-necked bladderworm	*Taenia hydatigena*	Mesenteries
Whipworm	*Trichuris ovis*	Large intestine
Legworm	*Wehrdikmansia cervipedis*	Under the skin
Meningeal worm	*Odocoileostrongylus tenuis*	Cranial cavity



Data from Dr. R. L. Beaudoin and the author, Pennsylvania State University.

sylvania. Many of the above species are reported from deer over much of their range in North America.

Unfortunately, we know little about the effects of parasites on deer. A parasite by definition derives nourishment from its host. If health of the host deteriorates as a result of many factors, including malnutrition, and numbers of worms increase drastically, then it is quite possible that parasites could play a role in deer mortality. For example, deer found dead in late winter had the same worm species as those killed during the previous hunting season, but *more* deer had a *greater variety* of worms.

Infection From Grazing

In addition, in some areas of Pennsylvania where deer numbers exceed browse-raising capacity of the land, deer are forced to graze more intensively on ground level vegetation, making acquisition of parasites more probable. As food resource material is depleted, parasite infections could become more important in their effect on the host (as can occur in overstocked livestock areas).

Problems which might arise from deer having too many worms could be viewed as those of proper deer herd management. It should be obvious that at the present time control of deer parasites through use of drugs is not feasible and may not be desirable due to cost of implementation. But through deer harvest, deer numbers can be kept in harmony with their environment, food supply and perhaps worm burdens. Severe parasite infections may serve as sentinels, forecasting improper balance between deer and habitat. Little more than speculation can be made at present, since we are ignorant of the occurrence of many of the parasites of deer, let alone their pathological and management implications.

Generally, the hunter need not be concerned about venison contamination by internal parasites. Using typical field-dressing procedures, little contact is made with parasitic species, and even if there were, few are infective to man. Thus, chances of self-infection by deer parasites through cleaning and/or eating venison is virtually impossible if reasonable sanitary practices are followed. Danger here is certainly no more than that involved in consuming properly processed pork, beef or lamb.

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